

## Cossidae from Chile (Lepidoptera)

By

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(Plates IV—VI)

Dr. Eugene Munroe, of the Canada Department of Agriculture (Division of Entomology) at Ottawa, recently presented to the Carnegie Museum a number of Cossid moths from Chile. Although material from such an isolated and poorly known region *a priori* should be of more than usual interest, I was nonetheless totally unprepared for the treasure-trove which these twenty-odd specimens turned out to be when they had been spread and examined.

Eight species, representing six genera, comprise the lot. Of these six genera, two are new and three are so poorly known that their affinities have been impossible to ascertain and clearly merit redescription. What is more, one of these latter genera (*Chilecomadia*) and one of the new ones form together an isolated group in the family, of special and hitherto unguessed interest and significance from the point of view of its affinities and systematic position.

To Dr. Munroe, for this most generous and valuable gift, go my warmest thanks. He has not only notably enriched the museum collection but through the medium of the present paper has, I hope, clarified the identities and positions of some unusual and hitherto very imperfectly known genera.

### 1. The *Chilecomadia* Group of Genera.

Antennae uniserrate, either longitudinally or transversely; palpi well developed, upturned. Fore wing: areole present, small, not produced beyond cell-end;  $R_1$  from cell before it; radial veins all free or  $R_1$  and  $R_5$  short stalked;  $R_5$  in the former case from end of chorda (or even from cell-end a very little below areole); remaining cell-veins all free; median stem present, forked in cell, the bifurcation about opposite origin of  $R_1$ ; cubitals apical, lower angle of cell not retracted; 1A present, free from

2A; 3A enters 2A well out from the base and nearly at right angles, forming an elongate, apically nearly quadrate, basal cell. Hind wing: Sc free from base, without any cross-veins from cell or from Rs; Rs and  $M_1$  remote at origins, subparallel; remaining cell-veins free; median stem present, forked in cell; three anal veins, 2A basally bifurcate; frenulum (and fore wing retinaculum) well developed. Hind tibia with two pairs of spurs; fore tibia with small epiphysis. Abdomen proximally excavated, with basal sternite (fused sternites 1 and 2) thickened and scaleless on its anterior half, with a thinner central area latero-ventrally on either side, the whole representing apparently a rudimentary abdominal tympanum.

Male genitalia. Uncus heavily sclerotized, bilobed, the lobes slight, separated by a shallow notch; gnathos U-shaped, attached on either side to the tegumen, in lateral view emitted from sides of tegumen in an anteroventral direction, then curving down, the whole situated very anteriorly; gnathos midventrally thickened (*Chilecomadia*) or not, with a slender, strap-like subsclaphium arising from its posterior edge, curving upward and then posteriorly to end more or less before end of uncus; vinculum slender, with an apparent transverse suture separating it from the tegumen dorsolaterally; saccus short but stout, digitate and abrupt; valve entire, longer than wide, nearly simple but with a small, proximal, minutely denticulate process near the proximodorsal angle on the mesial face; subapically with a flange or slight dorsal projection; anellus a pair of stout, entire, small, apically spinose or denticulate, digitate structures; penis about as long as valve, nearly straight and cylindrical, foramen nearly at proximal end, caecum penis only about as long as penis diameter at foramen; vesica slight, unarmed; apical portion of penis with a small tooth on either side, that on the insect's right being proximal to that on the left (curious, but quite constant in all four preparations made of the group: one of each species of *Chilecomadia* and two of the new genus and species).

Female genitalia (seen only in *Ch. moorei*, see Pl. IV. Fig. 4). Of the piercing type, but shorter than usual. Posterior apophyses long, slender, about twice the length of the anterior, abruptly and shortly thickened and slightly angled at a point a little posterior to their middle; tergite 8 well sclerotized, interrupted both dorsally and ventrally to leave it as a pair of lateral pieces; just beyond their sclerotized parts is a transverse

single row of setae, continuous middorsally but interrupted coextensively with the sclerotized portion ventrally; a few setae on the ventral edges of the sclerotized part; anterior apophyses bifurcate, one ramus attached to and supporting the lateral piece of tergite 8, the other ramus slightly flared, curving downward to support (but not touch) the rounded-triangular post-ostial plate; ostium situated just posterior to a broad, nearly rectangular, strongly sclerotized ventral plate, just anterior to which is a transverse plica in the ventral membrane, into which the anterior edge of the plate disappears; ductus bursae sclerotized, the anterior edge of the sclerotized part strongly diagonal (ventral side longer); connection to oviduct leaves ductus bursae dorsally, just beyond edge of the sclerotized part; bursa copulatrix an elongated sac without special structures.

Remarks. The two genera which comprise this group, *Chilecomadia* and *Rhizocossus*, are very closely related and together form an assemblage which is not nearly allied to any other known cossid. This is not to say, however, that its affinities cannot be perceived: on the contrary, they are quite evident, and lie in several different directions, enough to indicate that it may be very close in structure to the original ancestor of the family. A detailed analysis of these affinities is not possible here, since it presupposes an accurate higher classification of the family, which does not yet exist. I have, however, been at work for some time on just such a classification and hope therein to give this subject more extended discussion. At present I shall limit my remarks to an enumeration and brief discussion of the apparent nearest relatives.

1. *Dudgeonea* Hamps. This Old World (Madagascar, Africa, India, New Guinea and Australia) genus has a well developed abdominal tympanum (Kiriakoff and Clench, MS) and for this reason came immediately to mind. The relationship surely exists, as shown by other structural similarities besides the tympanal structure. The venation of the two is rather close: *Dudgeonea* differs chiefly in the areole projecting beyond the fore wing cell, the lower cell angle strongly retracted and hind wing veins  $R_s$  and  $M_1$  connate. Male and female genitalia are strongly differentiated, however. In the former *Dudgeonea* has a beaked uncus, mesially separated gnathos and penis with a very long caecum; in the latter *Dudgeonea* has the ovipositor much shorter (posterior apophyses very little longer than the anterior), the

ostium apparently without a supporting ventral plate and tergite 8 with the apical bristles on the sclerotized part in a moderately broad band, rather than in a single row in the membrane distad of the sclerotized part as in *Chilecomadia*.

2. *Ptilomacra* Walker (Australia). Like *Dudgeonea* and the *Chilecomadia* group, this genus is not near any other known cossid and seems to occupy a very primitive position. In facies it is hardly even cossid-like and bears little resemblance to *Chilecomadia* or *Rhizocossus*, being large, ample-winged, brown, with densely woolly head and body and long-bipectinate antennae. In structure, however, there is extensive resemblance: venation very similar, palpi and leg structure close and with several important correspondences in the male genitalia. The notable differences are: retracted lower cell angle and shorter, acuminate anal (2A—3A) cell of fore wing; unnotched, tapered uncus (almost „beaked“) and entire, nearly disk-like anellus of male genitalia; longer, less curved tarsal claws. The resemblances have to do, almost all of them, with primitive characters and are the sort one would expect to find shared by members of separate phyletic lines near the origins of those lines. This I suspect to be the case here and if *Ptilomacra* should eventually be placed in a common taxon with the *Chilecomadia* group, it probably will be one consisting of a primitive collection of root-members of several phyletic lines.

3. The *Cossula* group (American, chiefly tropical). Save for the origin of fore wing vein from the areole and the beaked uncus this group stands very close to *Chilecomadia* and *Rhizocossus*, perhaps closer than any other. Among the interesting similarities shared by the two groups the following may be mentioned. Frequent origin of  $R_5$  from end of chorda or from cell-end below areole (while not universal in either group, this trait is suggestive because it is found in no other cossid group, save the very different *Givira-Langsdortia* group, discussed below, though occurring regularly in some non-cossids); the mesially united gnathos of the male genitalia; the ramus of the anterior apophysis of the female genitalia, supporting the post-ostial plate.

4. The *Cossus* group (chiefly holarctic and African). This group and the *Zeuzera-Xyleutes* group share a very long, piercing ovipositor in the female, separating them distinctively from other cossids. The ovipositor of the *Chilecomadia* group is transitional to this in many ways, being longer than usual (though not so

long as in the *Cossus* group), the terminal lobes elongated. Among the similarities between the *Cossus* group and the present group are: origin of  $R_1$  before areole; occasionally notched uncus; antennal structure (e. g., in *Cossus cossus*, which has transverse lamellae similar to, though larger than, those of *Chilecomadia*, and not known in other cossid groups at all). The gnathos in the male genitalia is mesially occasionally separated in the *Cossus* group, but the two arms are mesially contiguous and apparently held together by a membrane when this is true. Among the observed differences; The areole of the *Cossus* group is usually much enlarged and produced far beyond the cell-end; hind wing veins  $R_s$  and  $M_1$  are usually connate or stalked; the long ventral ramus of the anterior apophysis (female genitalia) is represented only by a short stub and the setae on tergite 8 are not confined to a distal band, but are distributed well over the surface, though more dense distally.

#### Key to the *Chilecomadia* group, on superficial characters

- 1 a. Fw with basal  $\frac{1}{4}$  distinctly paler than remainder of wing, delimited by a more or less distinct transverse black line; cross-striae nearly black; antennae blackish or dull red . . . . . 2  
 b. Fw with ground color uniform, not paler basally; no transverse line at  $\frac{1}{4}$ ; cross-striae gray, not black; antenna orange red . . . . .  
 . . . . . *Rhizocossus munroei*  
 2 a. Hw black except narrowly along costa . . . . . *Chilecomadia valdiviana*  
 b. Hw nearly pure white . . . . . *Chilecomadia moorei*

#### *Chilecomadia* Dyar and Schaus

Dyar and Schaus 1937, in Seitz, Großschmett. Erde 6: 1274 (Genotype: *Langsdorfia moorei* Silva Fig. 1915, Chile); Viette 1951, Lambill. 51: 40.

Male. Vertex and front rough scaled; antenna stout, about half as long as costa; shaft of about 73—74 segments (both species), transversely lamellate (Pl. V. fig. 2B), the lamellae rounded, thicker on proximal part of shaft; palpus upturned, well surpassing frontal vestiture, ventrally rough scaled.

Venation as illustrated (Pl. V. fig. 2A). Note stalked  $R_1$ — $R_3$  from areole beyond end of chorda.

Legs. Fore tibia with epiphysis; hind tibia unswollen (greatest diameter ca.  $\frac{1}{7}$  the tibial length), with two pairs of spurs; claws curved, simple, with well developed pulvillus, the paronychial short and slight; leg segment lengths (in multiples of hind basitarsus length) as follows:

	fore leg	middle	hind
Femur . . . . .	2.1	2.7	2.1
Tibia . . . . .	1.4	2.1	2.7
Tarsus I (basitarsus)	0.8	1.1	1.0

Base of abdomen about as in *Rhizocossus* (q. v.). The abdomens of both males (*valdiviana* and *moorei*) were removed for genital dissection before an in situ description was made.

Male genitalia (Pl. IV, figs. 1,2). Uncus broad, slightly narrower apically than basally, with two distinct apical lobes separated by a broad, rounded, shallow notch; gnathos mesially connected, slender and strap-like, arching anteriorly and downward with an abrupt, thickened, densely scobinate midventral area; from this area a slender, elongate, sclerotized plate (underlying the rectum) extends posteriorly to before the end of the uncus; vinculum slender; saccus stout, digitate, short; valve twice or more as long as broad, entire, rounded, the apex thick but with a shallow sulcus peripherally dividing off a mesad flange; near the proximal dorsal angle a small denticulate thickened ridge. Anellus and penis as in *Rhizocossus*, save that the penis has the short caecum provided with broad lateral wings and the apex of the shaft is uniformly chitinous.

Female genitalia. Described and discussed in the general description of the group above.

Remarks. The differences between this and *Rhizocossus* are discussed under the latter below. Two species are known:

#### *Chilecomadia valdiviana* Philippi

*Cossus valdiviana* Philippi 1860, *Linnaea Ent.* 14: 291 (Chile, "near Corral" [Pto. de Corral, Prov. Valdivia], location of type unknown to me).

*Langsdorlia valdiviana*: Butler 1882, *Trans. Ent. Soc. London* 1882: 3 (Las Zonas, January).

*Hypopta valdiviana*: Dalla Torre 1923, *Lepid. Cat. pars* 29: 24.

*Chilecomadia valdiviana*: Dyar and Schaus 1937, in Seitz, *Großschmett. Erde* 6: 1275.

A single male at hand: Nevado Chillan, 1480 m., Chile, 10. XII. 1954 (L. Peña).

The fore wings are darker than those of *moorei*, and have a slight brownish cast absent in that species; a curved black line from costa at  $\frac{1}{4}$  to 2A where 3A enters it is somewhat stronger than in *moorei*. The most striking difference between the two, however, is the color of the hind wing: almost black in *valdiviana*, nearly pure white in *moorei*. Further, the hind

wing of *valdiviana* appears slightly more angulate at apex and tornus.

The male genitalia of the two species (*valdiviana*, Pl. IV, fig. 1; *moorei*, Pl. IV, fig. 2) are very similar. The chief differences are: in the present species the sides of the valve are less sinuate than in *moorei*; the median scobinate portion of the gnathos is distally more rounded, more laterally produced in *moorei*; the largest teeth of the anellus of *valdiviana* are barely half the size of the largest in *moorei*; in *moorei* the end of the valve is rounded and the inner flange is concentric; in *valdiviana* the end of the valve is subangulate, the inner flange produced beyond the valve border dorso-apically, retracted below,

According to Philippi (loc. cit.) the larva is a borer in *Weinmannia trichosperma* (fam. *Cunoniaceae*, nr. *Saxifragaceae*).

#### *Chilecomadia moorei* Silva Figueroa

*Langsdorfia moorei* Silva Figueroa 1915, Bol. Mus. Nac. Chile 8: 53 (No type locality given; Lontué and Santiago cited as other localities, and I hereby select the latter as Type Locality. Dyar and Schaus state that cotypes are in the U. S. National Museum.).

*Chilecomadia moorei*: Dyar and Schaus 1937, in Seitz, Großschm. Erde 6: 1274, fig. 183 c.

Two specimens at hand: a male, Guayacán, Santiago, Chile, X. 1952 (L. Peña); and a female, El Peumo, Chile, XI. 1951 (L. Peña).

Comparisons with *valdiviana* are given above. The genitalia are illustrated in plate IV figure 2 (male) and 4 (female). Superficially this species exhibits a considerable similarity to *Rhizocossus munroei* and it is possible that specimens of the latter may be in some collections under *moorei*.

According to Dyar and Schaus (loc. cit.) the larva is a borer in willow.

#### *Rhizocossus* new genus

Genotype: *Rhizocossus munroei* n. sp.

Male. Vertex and front rough scaled; antenna stout, a little over half as long as fore wing costa, the shaft composed of between 60–67 segments; dorsally sparsely scaled, the scales fugitive; shaft segments (Pl. V, fig. 1C) slightly lamellate longitudinally, the lamellae thick, triangular when viewed from the end, nearly rectangular when seen from the side (the spaces between adjacent lamellae being therefore narrow and not easily

seen, especially in the proximal part of the shaft). Palpus (Pl. V, fig. 1B) surpassing frontal vestiture by about the diameter of an eye, upturned to about middle of eye, ventrally rough scaled.

Fore wing: areole present, not surpassing cell-end,  $R_1$  from cell before it by somewhat less than the length of areole;  $R_2$  from costal edge of areole, well separated from  $R_3$ ;  $R_3$  and  $R_4$  approximated at origins but separate, arising from end of areole;  $R_5$  from end of chorda (internal vein of areole) or from cell-end very slightly below areole; medians and cubitals all free and well separated from cell,  $M_1$  from cell-end well below areole,  $Cu_2$  arising slightly distad of base of areole; lower angle of cell not retracted; median stem present, forked in cell, the bifurcation barely distad of origin of  $R_1$ , the costal branch ending a little below  $M_1$ , the posterior branch about midway between  $M_2$  and  $M_3$ ; posterior arculus present, connecting M and Cu near base; 1A present, free from base to tornus; 2A sinuate, to tornus below 1A; 3A entering 2A at about  $\frac{1}{3}$  the length of the latter and nearly at a right angle, forming an unusually large basal cell.

Hind wing: Sc from base to costa just before apex, with no cross-veins to it from cell or  $R_s$ ; cell about half as long as wing;  $R_s$  and  $M_1$  remote at origins and subparallel; remaining medians and both cubitals free and well separated from cell; median stem strong, forked in cell, the bifurcation a little basad of origin of  $Cu_2$ ; 3 anal veins, the middle one basally bifurcate. Frenulum stout, long, engaging a retinaculum on fore wing.

Legs: Fore tibia with epiphysis; hind tibia swollen (greatest diameter about  $\frac{1}{5}$  the tibial length), with two pairs of spurs; claws large, curved, with well developed pulvillus, but with paronychia very short and slight. Leg segment lengths (in multiples of hind basitarsus length) as follows:

	fore leg	middle	hind
Femur . . . . .	2.2 . . . . .	2.9 . . . . .	2.2
Tibia . . . . .	1.7 . . . . .	2.3 . . . . .	2.6
Tarsus I (basitarsus)	0.9 . . . . .	1.2 . . . . .	1.0

Base of abdomen with proximal sternite (fused sternites 1 and 2) lateroventrally impressed to form a cavity between it and posterolateral face of thorax, proximally strongly sclerotized, unscaled, with a central thinned area on either side and a median rounded keel midventrally; the naked area produced



anterodorsally into an invaginated pocket just below the pleural region: the entire area giving the impression of a definite, though primitive, tympanal structure.

Male genitalia. (Pl. IV, fig. 3). Uncus and tegumen well fused, together strongly tapering posteriorly, nearly straight sided; uncus ending in a feeble pair of lobes, with a shallow rounded notch between; gnathos a slender strap-like structure extending anteriorly and ventrally, continuous across middle, without any noticeable thickening mesially, though a reduced scobinate area can be seen; vinculum slender; saccus stout, digitate, short; valve rounded, entire, about twice as long as wide, with a slight mesad-directed lobe on dorsal border near apex; anellus a pair of digitate thickened processes bearing a few stout teeth distally, interspersed with setae, connected to each other mesially, at a small area of the proximal part of each; dorsal part of valve proximally with a thickened denticulate ridge on mesad face. Penis simple, cylindrical, nearly straight, the vesica unarmed, but with two small lateral teeth on distal part of shaft, one on each side, the wall of the shaft greatly thinned in their vicinity, membrane-like; foramen penis nearly circular, about as far from proximal end as its diameter- the caecum penis thus short, but present, lacking the lateral wings of *Chilecomadia*.

Remarks. Closely related to *Chilecomadia* but separable as follows: antennae short longitudinally lamellate rather than transversely lamellate, composed of fewer segments;  $R_5$  of fore wing remote from  $R_4$  and from end of chorda or below; swollen hind tibia; strongly tapering, more weakly bilobed uncus; gnathos without ventral thickening of the scobinate area.

The name is given in allusion to its primitive phyletic position, not to any presumed habits of the larvae- which are unknown.

### **Rhizocossus munroei** n. sp.

Male. Antennae orange red; frons and vertex with mixed blackish and pale gray hair-scales; palpi similar, though the black predominates much more; thorax dorsally of mixed blackish and pale gray hair-scales, the general aspect gray; ventrally similar but the hairs longer and the black less numerous so that the general aspect is a paler gray than above; legs paler still, almost white, the numerous black tarsal spines in sharp contrast; abdomen as thorax, about  $1\frac{1}{2}$  times as long as hind wing inner margin.

**Upperside.** Fore wing: gray, marked with faint, slightly darker cross-striae; a quadrate patch of slightly darker gray basally edged by the cell-end, posteriorly by  $Cu_1$  and costally lost in the costal border of denser, somewhat darker cross-striae; a feeble, slender subterminal line of nearly connected single cross-striae is sometimes apparent. Fringe gray, paler in proximal half, nearly white distally between the veins, at vein-ends sometimes darkened. Hind wing: usually somewhat paler, but may be infuscated with blackish (one out of the five). Fringe concolorous, may be slightly darkened at vein-ends.

**Underside.** Fore wing: gray, darker along costa; a dark discal shade beginning at cell-end and extending at least half-way to termen and usually much more, occasionally reaching termen: this shade composed of short, suberect scales. Hind wing much paler, with faint cross-striae in distal half of wing. Fringe of both wings with the darkening at vein-ends a little more prominent than above.

Length of fore wing (males only): 18.5—22.0 mm.; mean (5 specimens), 20.1 mm.

Holotype, male, Caramavida, Chile, 25—31. XII. 1953 (L. Peña) (Male genitalia slide C-490); four male paratypes, as follows: two, same data as holotype; one, Pinchinahuel, 1100 bis 1400 m., 23—31. I. 1954 (L. Peña); one, Las Cabras, 1480 m., 10—23. XII. 1954 (L. Peña). All types, C. M. Ent. type series no. 325.

**Remarks.** Closely resembles *Chilecomadia moorei* in facies. Aside from the generic characters (of which the antennal structure is most readily and easily seen), differing in the more even gray of fore wing, the cross-striae fainter, gray rather than black, tending less to form transverse lines. The antennae are also brighter red.

It is a pleasure to dedicate this distinct new species to my good friend Dr. Eugene Munroe.

## 2. The Givira - Langsdorfia Group of Genera.

In 1911 Barnes and McDunnough (Contr. Nat. Hist. Lep. N. Am. vol. 1, No. 1) separated a small group of cossid genera as the subfamily *Hypoptinae*. Much more recently Forbes (1942, Bull. Mus. Comp. Zool. 90: 265 ff.) referred to the same group as the tribe *Hypoptini* of his subfamily *Cossinae*.

Pending a reclassification of the whole family it seems best to avoid use of formal ranks for the various higher groups. Further, a name for this group cannot be based on the genus *Hypopta* Hbn., which is palearctic and has nothing to do with the assemblage here under discussion. For these reasons I refer to this group under the temporary name given above.

As Forbes (loc. cit.) has pointed out, the nearest affinities of the *Givira-Langsdorfia* group, which is purely American, are with the African and Asiatic *Metarbelidae*. Together these two are much more closely interrelated than either is to any other cossid.

The group may be divided into two sections, probably artificial at least in part, but useful nonetheless:

**Section 1.** Hind tibia with one pair of spurs. Hind wing veins Rs and M<sub>1</sub> almost always connate or stalked. Includes *Givira* only of the genera discussed in this paper, but with a number of other genera also belonging.

**Section 2.** Hind tibia with two pairs of spurs. Hind wing veins Rs and M<sub>1</sub> usually remote at origins. Since this group includes three genera discussed in this paper (and few others), it may be helpful to provide a key to the genera of this section, so far as I know them:

**Key to Section 2, *Givira-Langsdorfia* Group.**

- |  |   |
|--|---|
| 1 a. Antenna of male (and female?) nearly as long as fore wing costa; hw Rs and M <sub>1</sub> stalked. . . . .  | <i>Acousmaticus</i> Butl.                   |
| b. Antenna about half as long as fw costa, or less; hw Rs and M <sub>1</sub> free and separate, rarely almost connate. . . . .                                     | 2   |
| 2 a. Fw R <sub>4</sub> and R <sub>5</sub> stalked. . . . .   | 3   |
| b. These veins separate. . . . .   | 4   |
| 3 a. Fw with 1 A and 2 A connected by a cross-vein. . . . .  |   |
| . . . . . (se neote below) . . . . .   | {   |
|  | <i>Diarthrosia</i> Bryk 1945                |
|  | <i>Allocossus</i> Bryk 1945                 |
|  | „ <i>Hypopta</i> “ <i>palmata</i> B. & McD. |
| b. Fw 1 A and 2 A connected by anastomosis . . . . .   | Genus ?                                     |
|  | (2 sp. seen, Bolivia & Argent.)             |
| 4 a. Frenulum and retinaculum present; no cross-vein between upper angle of cell and Sc, hw; fw with 1 A and 2 A apically anastomosed. . . . .                     | <i>Philiodoron</i> n. gen.                  |
| b. Frenulum and retinaculum absent; cross-vein from upper cell angle to Sc present; fw with 1 A and 2 A free, the former obsolescent at least proximally . . . . . | 5   |
| 5 a. Fw with areole projecting beyond cell-end, 1 A remote from 2 A apically, obsolescent only proximally; palpus not surpassing frontal vestiture . . . . .       | <i>Philanglaus</i> Butl.                    |

- b. Fw with areole not extended beyond cell-end; 1A apically very close to 2A, obsolescent for most of its length; palpus extending well beyond frontal vestiture . . . *Langsdorfia* Hubn.

Note. The genera *Diarthrosia* and *Allocossus* were described by Bryk in 1945 (Arch. Zool. 36A: 24, 25, resp.), from single specimens each, both captured in Patagonia. Although the descriptions are very insufficient, enough details are given (some accidentally, as the fore wing venation of *Allocossus*, visible in the photo of the type specimen!) to place them in this section. I do not know how, if at all, they may be distinguished from each other or from the western North American species „*Hypopta*“ *palmata* B. & McD., which has essentially the same fore wing venation. Whether or not the three are congeneric is a problem that will have to await further information on the structure of Bryk's genera.

### ***Givira leonera* n. sp.**

Male. Vestiture of vertex and antennal scapes mixed blackish and pale gray; frontal vestiture somewhat appressed, mesially colored as vertex, laterally black; palpi blackish gray, porrect, extending far beyond frontal vestiture; antennae to about  $\frac{1}{2}$  costa, the shaft of about 50 segments, short bipectinate (longest rami about as long as 2 shaft segments); thorax dorsally mixed pale gray and blackish scales, evenly intermixed to produce an even gray color to the naked eye; thorax ventrally paler, without black admixture, legs colored as thoracic dorsum; abdomen above and below as thoracic dorsum, with a proximal dorsal tuft of black, followed by a much smaller one (probably on segments 3 and 4 but impossible to confirm without damage).

Venation. Fore wing; areole present, not surpassing cell;  $R_1$  from cell well before it;  $R_2$  and  $R_3$  from it;  $R_4$  and  $R_5$  stalked from cell-end below areole; median stem forked in cell, the bifurcation beyond origin of  $R_1$  but before that of  $Cu_2$ ; 1A and 2A connected by a cross-vein apically. Hind wing: a cross-vein to Sc from cell just before upper angle;  $R_s$  and  $M_1$  well stalked; median stem forked in cell, the bifurcation about opposite base of  $Cu_2$ . Three anal veins. Frenulum present but short; no retinaculum.

Legs. Fore tibia with epiphysis; hind tibia with one pair of spurs.

**Upperside.** Fore wing ground color ashy gray (composed of scales dark brownish gray proximally and white distally); a brownish shade just beyond cell, diagonal, from basal part of  $Cu_2$  to near costa at base of  $R_5$ ; a white streak at cell-end; cell with a few tiny black dots on the gray ground and costa for its whole length with small black dots. Distal part of wing above  $Cu_2$  with fine brown cross-striae, gathered into hints of transverse lines. Area below cell and  $Cu_2$  brown with numerous fine white cross-striae and a few dark brown ones.  $R_5$ , all medians and cubitals and both anals all finely pencilled with pure white. Termen with a pair of small black dots at each vein-end, one on either side. Fringe gray with a white line before middle and another at end, with additional white scales between the veins: the general effect to the eye being checkered. Hind wing pale gray, white in cell, basal fourth of wing and along costa almost to apex; distal part of wing crossed by a few sparse, very feebly indicated, cross-striae. Termen with paired spots at the vein-ends as on fore wing but not so dark. Fringe as on fore wing.

**Underside.** Fore wing gray, becoming paler basad and nearly pure white on inner margin below 1A; a white streak at cell-end; costa with a row of blackish dots for its whole length; a few blackish cross-striae in apical area; paired black dots at vein-ends as above; fringe as above, dark areas darker, completely interrupted between veins by white, increasing the checkered appearance. Hind wing whitish, crossed, except in base, by fine brownish cross-striae, gathered into shorter or longer fine irregular lines. Termen with paired black dots at vein-ends. Fringe as on fore wing but dark areas much paler, the checkered effect not so noticeable.

**Male genitalia** (pl. VI, fig. 3). Uncus long, slender, nearly straight, apically slightly but sharply down curved, proximally with a deep dorsal sulcus; well separated from tegumen by a prominent suture; gnathos a pair of long, tear-drop shaped plates, joined or nearly so along one side to posterior border of tegumen; at dorsal angle of each valve and attached by a stalk to it and to the adjacent vinculum, a flared apically deeply sulcate process; vinculum separated by a strong suture (just dorsad of the origin of the above process) from tegumen, anterior portion expanded, parallel-sided, then constricted ventrolaterally just before reexpanding ventrally; saccus short, digitate. Valve long, slender, apically tapering to an elongate, slender, upcurved hairy tip; proximally

with the dorsal process as described; ventral border strongly incurved, basally produced and fusing with anellus at latter's midpoint; anellus trough-like, posteriorly with a small ventral notch, expanding before middle at attachment of ventral borders of valves, anteriorly tapering to a small-nippled, rounded tip; penis cylindrical, straight, without caecum; proximal half abruptly thicker walled than distal half; apex flared, emarginate laterally leaving slight dorsal and ventral lips.

Length of fore wing: 13mm.

Holotype, male, La Leonera, Rancagua, Chile, 1. II. 1953 (L. Peña) (slide C-511, male genitalia). C. M. Ent. type series no. 326.

Remarks. The most striking fact about this little species is its close relationship, not to other South American congeners, but to several North American species, in particular *G. ethela*, Neum. & Dyar (1893, Journ. N. Y. Ent. Soc. 1: 83), described from Colorado and at hand from Utah and California. This close relationship is indicated by the following shared characters: gray body; abdomen with a large dark tuft and smaller one behind; gray wings with darker diagonal shade beyond cell; white streak at cell-end; cross-striae in distal area; paired black spots at vein-ends; identical configuration of frontal vestiture and palpi.

*G. ethela*, however, has the antennal rami a little longer (longest rami about as long as three shaft segments); fewer antennal shaft segments (ca. 40), wings more uniform in color; dark shade beyond cell not as long nor as broad as in *leonera*; cross-striae less prominent; the area below cell and  $Cu_2$  not different from distal area; veins not pencilled with white; valve apically without the long, curved digitate projection.

In venation the two species are identical save that in *ethela* there is no cross-vein from cell to Sc near upper cell angle.

The zoogeographical aspects of these close relatives, one in Chile and the other in western North America, are most interesting. The *Givira-Langsdorfia* group is of uncertain origin. Its closest affinities, as mentioned above, are with the essentially African family *Metarbelidae*. How these two groups themselves originated is a mystery, though one possibility is that both stemmed originally from an Asiatic ancestor. At any rate the most primitive known members of the *Givira-Langsdorfia* group are preeminently South American and apparently predominately Andean. The North American members (chiefly section 1)

now known are clearly representatives of a depauperate fauna of neotropical origin. Whether *G. leonera* represents a derivative of North American descent, or an ancestral form from which one or more northern species were derived, is not even guessable with accuracy in the current state of ignorance of the phylogeny of its near allies. Assuming, however, that *leonera* was derived from North American stock (which best fits what few data we have on the question: several northern species; the Chilean form systematically isolated there), its ancestral stock would have quite possibly made the following migrations: from Asia to North America to South America (ancestor of *Givira-Langsdortia* group); from South America back to North America at a much later date (ancestral member of the northern *Givira*); again to South America (ancestral *leonera*), possibly quite recently (Pleistocene?).

#### *Acosmaticus* Butler

Butler 1882, Trans. Ent. Soc. London 1882: 8 (Genotype: *A. magnicornis* Btl. 1882, l. c., Chile; „*Psychidae*“); Waterhouse 1883, Aid Ident. Insects 2: 18, pl. 132, fig. 3 (*Psychidae*); Schaus 1905, Proc. U. S. N. M. 29: 340 (*Cossidae*; in key to genera of family only); Dalla Torre and Strand 1929, Lepid. Cat. pars 34: 182 (as *Acosmaticus*; *Psychidae*); Gaede 1936, in Seitz, Großschmett. Erde 6: 1180 (*Psychidae*, with doubt); Bryk 1937, Lepid. Cat. pars 81: 2 (*Cossidae*).

The description below is based on one male, probably of *magnicornis* Btl.: La Leonera, 850 m., Chile, 26—28. XII. 1954 (L. Peña).

Vertex and frons (pl. V fig. 38) with long, tousled hair scales, including a long tuft on antennal scape; palpus (pl. V fig. 38) projecting beyond frontal vestiture, about twice as long as eye diameter, ventrally with long erect hair scales; antenna about  $\frac{4}{5}$  as long as fore wing costa, shaft composed of about 35 segments; long bipectinate, the rami arising very proximally on each segment (pl. V, fig. 3C), irregularly disposed, longest rami about 11 times as long as a shaft segment. Hind tibia with two pairs of spurs. Abdomen about  $1\frac{1}{2}$  times as long as hind wing inner margin.

Venation. As illustrated (pl. V, fig. 3A). Note especially the slightly concave costa; blunt, rounded apex and tornus; all radials free,  $R_4$  and  $R_5$  both from cell-end below areole; distinct gap between origins of  $M_1$  and  $M_2$ ; 1A apparent only terminally, nearly or actually touching 2A at tornus. Hind wing with a

cross-vein to Sc from cell-end; Rs and M<sub>1</sub> short stalked; anal veins almost obsolete; frenulum and retinaculum present. Length of fore wing 9 mm. (expanse 19 mm.).

Male genitalia (pl. VI, fig. 5). Uncus separated from tegumen by a well marked suture, narrow and beaked, proximally with a remarkable dorsal lobe, laterally compressed, from the side oval, constricted at base, the sides well covered with a fine pile of short setae; vinculum broad, quadrate; saccus a short, knob-like structure; anellus apparently absent; valve simple, dorsal and ventral borders parallel, end rounded, proximal edge straight, diagonal; ventral edge notched at a little beyond  $\frac{1}{3}$ ; mesially with a small, irregularly dentate, basad pointed lamellate process; penis slightly curved, cylindrical, without caecum but base with a pair of anteriorly pointing, slightly divergent horns.

This is a peculiar little insect. Its small size, long antennae with „tousled“ long pectinations, thinly scaled, rounded wings are all very uncossid-like and not dissimilar to certain *Psychidae*: it is, no doubt, for these reasons that Butler was led to place it in that family. In truth, however, all its characters place it in section 2 of the *Givira-Langsdorfia* group. It is an interesting member, in that it is the sole exception in the section, having hind wing veins Rs-M<sub>1</sub> stalked instead of remote.

#### *Philanglaus* Butler

Butler 1882, Trans. Ent. Soc. London 1882: 28 (Genotype: *P. ornatus* Btl. 1882, l. c., Chile; „*Hepialidae*“); Waterhouse 1883 (?), Aid Ident. Insects 2: 19, pl. 116 (*Hepialidae*); Dalla Torre 1923, Lepid. Cat. pars 29: 26 (*Cossidae*); Viette 1951, Lambill. 51: 60.

I have not seen the genotype and base the description below on *penai*, n. sp., which, however, appears extremely close to *ornatus*.

Vertex and front (pl. V, fig. 4c) with long erect hair scales; palpus (pl. V, fig. 4c) porrect, reaching as far as frontal hair, ventrally with suberect hair scales; antenna bipectinate, the rami arising moderately proximally, longest rami about as long as 5 shaft segments; shaft strongly scaled dorsally; rami dorsally unscaled or the scales very fugitive. Hind tibia with two pairs of spurs. Abdomen about twice as long as hind wing inner margin.

Venation as illustrated (pl. V, fig. 4A). Note especially R<sub>5</sub> from cell-end below areole, all radials free; 1A proximally obsolescent, not connected with 2A at all; hind wing with cross-vein



to Sc from Rs just beyond cell; Rs and  $M_1$  remote at origins; both wings with median stem forked in cell. Frenulum and retinaculum absent. Length of fore wing 18 mm. (expanse 31.5 mm.).

Male genitalia (pl. VI, fig. 1). Uncus long, slender beaked; pronounced suture between it and tegumen; gnathos reduced to a small irregular plate on either side of uncus base; vinculum broad; saccus short; valve entire, about twice as long as broad, with a diagonal groove on mesad face extending from about middle of the proximal border to the ventral border at about  $\frac{1}{3}$ , the groove impressed, without the setae which are elsewhere rather densely distributed over the mesad face; proximal to this groove a distinct rounded ventral lobe with setae somewhat longer all directed distad; a long blade-like process from proximodorsal angle of valve, extending posteriorly and a little dorsad, nearly as long as valve; anellus apparently a simple U-shaped strap; penis simple, apically bluntly pointed, proximally without caecum, slightly flared about ostium.

This genus belongs in Section 2 of the *Givira-Langsdorfia* group (see discussion and key above), falling very close to *Langsdorfia*, as indicated by their sharing of such points as: all fore wing radials free; 1A obsolescent; hind wing without frenulum; costa well excised distally; cross-vein to Sc from upper angle of cell; and so on. From that genus it differs in the areole being produced beyond cell-end, 1A remote from 2A distally (almost contiguous in *Langsdorfia*), hind wing more rounded, Rs and  $M_1$  proportionally more remote; vertex and frons longer scaled, the palpus not surpassing the frontal scaling and longer, more roughly scaled ventrally. The male genitalia show, among other things, a longer, more simply digitate uncus, rather than the complex, proximally expanded structure of *Langsdorfia*.

### ***Philanglaus penai* n. sp.**

Closely resembling *ornatus* (cf. colored figure, Waterhouse loc. cit. supra), except as follows: Fore wing: basal irregular dark patch with lower distal arm completely cut off; the small enclosed white spot of the lower proximal arm is here enlarged and elongated to a white line from basal to distal edge of the arm; the cell-end diagonal bar and the subterminal line are not greenish but brown as is the basal patch; the subterminal line is not continuous but is broken, absent from  $M_1$  almost to  $M_3$  and the part below  $M_3$  about half as wide as in *ornatus*. Hind

wing: translucent white, brownish only on basal third and along costa. Fringe worn, not determinable.

Male genitalia (pl. VI, fig. 1). As described for genus, above.

Holotype, male, Pichinachuel, 1100—1400 m., Chile, 23 bis 31. I. 1954 (L. Peña) (slide no. C-514, male genitalia). C. M. Ent. type series no. 327.

Remarks. Named for the collector of the entire lot reported on in this paper, Sr. Luis Peña.

### **Philiodoron** n. gen.

Genotype: *Philiodoron cinereum* n. sp.

Male. Vertex and frons (pl. VI, fig. 2C) each with a long tuft of hair scales; palpi porrect, surpassing frontal vestiture, long rough-scaled beneath; antennal scape with a rather appressed tuft of scales anteriorly; shaft with about 35—41 segments, bipectinate with the rami proximal on each segment (pl. VI, fig. 2B), longest rami about as long as 6 shaft segments; between the bases of the rami on each segment a small tubercle-like prominence bearing several long sensory setae like those on the rami.

Venation (pl. VI, fig. 2A). Fore wing: areole present, not surpassing cell,  $R_1$  from cell well before it;  $R_2$  and  $R_3$  free from end of areole;  $R_4$  from end of chorda or from cell-end below areole;  $R_5$  from cell below areole (all radials arising free and separate from each other, save in a single abnormal *cinereum* in which  $R_3$ ,  $R_4$  and  $R_5$  are connate); distance between origins of  $M_1$  and  $M_2$  large; all median and cubital veins free from cell, origin of  $Cu_1$  forming lower angle,  $Cu_2$  arising far proximad of it; median stem forked in cell, the bifurcation about opposite origin of  $Cu_2$ ; 1A proximally obsolescent, distally fused at a point or briefly anastomosed with 2A. Hind wing: costa moderately excised from middle outward; Sc free from base to costa just before apex, no cross-vein to it from cell or  $R_s$ ;  $R_s$  and  $M_1$  separate at origins, though close and rarely almost connate, divergent distally; all median and cubital veins free from cell; median stem forked in cell. Frenulum stout, engaging a well-formed retinaculum on fore wing.

Legs. Fore tibia with epiphysis arising very near tibial base but not reaching its end; hind tibia with two pairs of spurs. Leg segment lengths, as multiples of hind basitarsus length, as follows:

	fore leg	middle	hind
Femur . . . . .	1.8 . . . . .	2.2 . . . . .	1.7 . . . . .
Tibia . . . . .	1.7 . . . . .	1.8 . . . . .	1.9 . . . . .
Tarsus I (basitarsus) . . . . .	1.3 . . . . .	1.0 . . . . .	1.0 . . . . .

Male genitalia (pl. VI, figs. 4, 6). Uncus slender, long digitate, beaked; well separated from tegumen by a strong suture; gnathos a slender median curved or angled piece, its ends attached by a long membrane to base of uncus; vinculum slender; saccus long, digitate, abrupt; anellus a simple trough-like piece; valve entire, longer than broad, with a short subapical dorsal angular process; penis simple, cylindrical, without caecum and without special structures.

Remarks. Belongs in section 2 of the *Givira-Langsdorfia* group of genera, as discussed above, coming near to *Langsdorfia* and *Philanglaus*. From these it differs in the longer antennal rami (as long as 4.5 shaft segments in *Langsdorfia*, 5 shaft segments in *Philanglaus*); apical fusion of fore wing veins 1A and 2A; absence of a cross-vein between upper angle of cell and Sc on hind wing; presence of a well-developed frenulum; absence of the long processes of the proximo-dorsal angles of the valves

### **Philiodoron cinereum** n. sp.

Male. Vertex, frons, palpi, antennal scapes and the shaft dorsally: all with mixed whitish and black-tipped scales, to the eye appearing gray; thorax dorsally similar but with some brown and pale tan scales and a tendency for the different colors to predominate in places: two transverse black bands on tegulae; a median black transverse tuft before middle, preceded by brown; a chevron-shaped black line at middle; thorax ventrally mixed black and white scales, roughly scaled; legs roughly scaled, similar in color, the tarsal segments darker with an apical white ring on each; abdomen similar, with two proximal black tufts dorsally and a pale tan terminal tuft.

Upperside. Fore wing gray; a basal black patch, often with paler tan spots within it, especially below cell, its distal limit from costa at about  $\frac{1}{4}$  or less, diagonally straight to a point just below origin of  $Cu_2$ , then abruptly angled inward to end on inner margin at  $\frac{1}{4}$  or so; area beyond this to cell-end pale gray, reaching costa; from cell-end half-way to termen a pale orange-tan patch; costa from beyond middle to apex with four blackish triangular spots; from base of  $Cu_2$  toward inner

margin a black-edged dark brown band, thin at  $Cu_2$  but expanding to 1A, where its proximal edge touches or almost touches the basal patch; beyond the tan patch at cell-end a diagonal dark shade; a subterminal black band from about  $R_3$  to just below  $Cu_1$ , interrupted completely between  $R_5$  and  $M_3$ ; terminal area with fine black cross-striae. Fringe tan, with a black line at middle and another at end, the former thicker at vein-ends than between them, the latter interrupted by white scales between veins, making a general checkered effect. Hind wing grayish, occasionally showing a few faint darker transverse lines; cell and costa whitish. Fringe as on fore wing, but with more terminal white.

**Underside.** Fore wing dark gray, especially beyond cell, with the subterminal black band and costal spots upperside repeated; fringe as above but the middle and terminal black lines heavier, almost fused together, leaving virtually only the basal tan line. Hind wing as upperside but paler, with a few scattered dark markings.

**Male genitalia** (pl. VI, fig. 4). Dorsal edge of uncus nearly straight in lateral view (the proximal paired carinae rather lateral and very low); gnathos evenly curved; saccus strongly curved (N. B. This is not due to distortion on slide); valve with dorso-apical projection provided with a mesad lamella; penis nearly straight, only very slightly curved.

Length of fore wing (males only): 14–17.5 mm, mean (10 specimens), 15.7 mm.

**Holotype**, male, La Leonera, 1700 m., Chile, 28. XII. 1954 (L. Peña). 9 male paratypes, all Chile, all collected by L. Peña, as follows: two, same data as holotype; two, La Leonera, Rancagua, 1. II. 1953; two Buchen, 1300 m., 11. I. 1955; two, Las Cabras, 1480 m., 10–23. XII. 1954; one, Hda. Illapel, 800 m., 28. X. 1954. **Holotype**, slide nos. C-510 (male genitalia); C-515 (legs). All types, C. M. Ent. type series no. 328.

**Remarks.** Comparisons with *Ph. frater* are made under that species below.

### ***Philiodoron frater* n. sp.**

Differs from *cinereum* as follows: fore wing with subterminal band not so dark, not interrupted between  $R_5$  and  $M_2$ ; tends more to be lost among the cross-striae; the specimens are in poor condition but the brownish patch at cell-end seems to be

fainter or absent; the triangular dark band that begins at base of  $Cu_2$  and runs to 1A is paler, barely standing out at all. The hind wing has the cross-striae finer, more numerous, not gathered into a few transverse lines.

Male genitalia (pl. VI f, fig. 6). Uncus with prominent paired dorsal carinae proximally; gnathos V-shaped; saccus nearly straight; valve with dorso-apical projection simple, without a mesial plate; penis slightly but abruptly curved at about  $\frac{2}{3}$ .

Length of fore wing (male): 15—16mm., mean (3 specimens), 15.5mm.

Holotype, male, Buchen, 1300m., Chile, 11. I. 1955 (L. Peñã); two male paratypes, both La Leonera, Rancagua, resp. 1. II. 1953 and 1. XI. 1953 (L. Peñã). All types C. M. Ent. type series no. 329.

Remarks. Extremely close in general appearance to *cinereum*, but the genitalia show them to be distinct.

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